Saguaro Census Citizen Science Project with Saguaro National Park and Adventure Scientists

Final report to NPS Citizen Science Steering Committee

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Summary

Saguaro National Park's Saguaro Census is a major citizen science event that takes place every 10 years. For the 2020 Census, the park partnered with Adventure Scientists, a non-profit group that recruits, trains, and manages skilled citizen science volunteers. Adventure Scientist volunteers (45 total) contributed 955.5 hours over 141 person-days, either on day trips or during two week-long camping trips. These volunteers generally had strong outdoors skills, learned quickly, and were great workers. They collected data on more than 5,000 saguaros, which greatly exceeded our expectations. They accomplished work at a much faster pace than our normal local volunteers and were able to work in more remote, steeper areas. One issue was that a few volunteers had limited outdoor skills, but we were able to resolve this. Communications between park staff and Adventure Scientists was excellent and we really enjoyed working with the volunteers, who seemed to have a great time as they learned about the Sonoran Desert. We would recommend working with Adventure Scientists for parks that have more challenging citizen science projects that require strong outdoor skills.

Background

Every 10 years, coinciding with the U.S. Census, Saguaro National Park conducts a major citizen science project called the Saguaro Census. The park uses the Census to monitor the population of our long-lived signature plant. The Census has a randomized design and quality control systems, and the results are published in peer-reviewed scientific journals. Typically, we bring local groups of 15-20 volunteers out on 6-hour Census events. Volunteers hike to the plots, where our interns train them on the ground to measure, map, and collect other data on saguaros. In 2010, over 300 volunteers collected data on more than 20,000 saguaros.

Because the plots are randomly located and Saguaro National Park has many hazards including rocky terrain, spiny plants, and venomous reptiles, safety is the most important aspect of the Saguaro Census. We work hard to match groups with plots that are appropriate for their ability. For example, high school classes work in areas next to trails, whereas we may take a hiking club group on a 3-mile hike to a more rugged study plot. However, we have struggled to find groups that can complete the most difficult plots in wilderness areas that require a very long hike, are in very steep terrain, or both.

Adventure Scientists (AS) is a national non-profit agency that matches skilled outdoor adventure volunteers with field scientists to conduct citizen science in remote areas. Park staff learned about AS and contacted them to see if they could provide volunteers to help us in the most difficult Census plots. We secured a small grant from the NPS Citizen Science Steering Committee to support this pilot program, which was administered through a sole source contract.

Methods

The park and AS set up four events: two weekend events (two days each) and two week-long events (5 days each). AS recruited on their website and social media, and selected volunteers who self-identified as being very fit and comfortable working off-trail in the desert. We aimed for 10-15 volunteers for each event. In the week before each event, AS turned over the contacts of the volunteers to park staff. For the week-long trips, the park arranged campsites; weekend volunteers were typically local or had friends or family in the area they could stay with.

At the park, we met the volunteers each day either at the campground (week-long) or designated place (week-end), drove them to the trailhead in our van. A few staff or interns hiked with them to the study plot, and directed their work in the field. Someone from the park worked with the volunteers each day to assure safety and quality control. On the first day for each group, we managed the volunteers as we would any group, but especially for the week-long groups they became more independent and were able to work with minimal help from park staff and interns.

Results

AS provided 45 volunteers who contributed 955.5 hours and 141 person-days of work to the park. We typically had about 12 volunteers for each weekend or week.

In total, the volunteers completed 6 saguaro monitoring plots and measured and mapped more than 5,000 saguaros. This was close to 20% of the total saguaros we surveyed during the entire 2020 Census, which is quite amazing! Due to this effort we were able to collect a full sample of all the Census plots,

which had not been done since the project's inception in 1990. This work gives us a much greater understanding how the saguaro population throughout the entire park has changed.

We were very pleased with the amount of work accomplished by the volunteers. They exceeded our expectations in terms of the quality of the work they performed, and we were able to complete some very difficult plots much more quickly than if we had used even our strongest local volunteers.

AS polled the volunteers on their experiences, and the feedback was very positive. It is worth mentioning that some of the high points including interacting with park staff. They were grateful that we reached out before-hand; brought them donuts one morning; provided a website (https://www.nps.gov/sagu/learn/nature/saguaro-census-2020.htm) where they could learn about the project, and where we later posted photos of them at work; and showed them graphs of the results of their work; and gave them bandanas, water bottles, stickers, and certificates. They appreciated that there was an organizational structure so they felt well-trained to do the work and knew what to expect each day.

Adventure Scientist volunteers measuring saguaros with a folding rule (left) and estimating height of a taller individual using a clinometer (right).

Challenges

There was really only one significant challenge, which was that some of the AS volunteers had different views of their ability to work outdoors than others. This could have had big implications for our project because on long hikes, the group is only as strong (and fast) as the slowest hiker. NPS and AS strongly emphasized how physically challenging the work would be, but we had several people drop out on or after the first day because the work was more than they expected.

We discussed these cases at length with AS staff. The problem for them is that it's not possible to do anything but have volunteers self-select themselves…and even if they are told repeatedly how difficult the work is, some people tend to overestimate their abilities. Nevertheless, on the last trip everyone was quite strong, so greater effort and phone interviews by AS did make a difference. In the park, we mitigated the issues by making the first day relatively easy. After that, we were lucky that all the weakest volunteers dropped out, but we felt that it was a gentle process and hoped that there were no

hard feelings. In the future we would probably consider setting up optional activities for volunteers with more limited outdoor skills. For our project, this issue ultimately did not impact the results. The great majority of the volunteers were very strong outdoor adventure types used to long back-packing trips, rock-climbing, and the like.

Volunteers typically worked in groups of about 12 with 2-3 park biotechs or interns.

Bottom line is that if we worked with AS again we would be sure to address these issues ahead of time and have a good plan for how we would deal with volunteers who were not as experienced or strong working in the outdoors as the other participants.

Two other minor issues came up: first, AS was initially slow in sending us the contact info for volunteers, and we were not sure how many people were coming. This was quickly resolved. Second, the contract was not as clear as it should be as to who is responsible for volunteer liability, AS or NPS.

Conclusion and Recommendations

Every park and project is unique, and we are certain that our experience with AS would be different than others. Saguaro National Park's need was for volunteers who could take on a citizen science project that was very physically challenging in a wilderness setting. We felt that these needs were met, and very affordably. Our recommendations for parks and project leaders include the following:

1. Make sure a campground or other accommodation is available and that volunteer physical needs are taken care of;
2. Work closely with AS staff to make sure that volunteers know what to expect and are capable of the work;
3. Have a strong plan so that volunteers know what to expect each day and can be productive; the plan should be based on experience with other groups so you know it will work;
4. Train volunteers well and make sure they understand why they are doing the work and why collecting high quality data is essential;
5. Have a back-up plan if volunteers show up who do not have the same work capacity as the rest of the group; the goal is that they can still feel worthy and productive while not greatly reducing the group's overall productivity;

6. Clarify if AS or NPS is responsible if a volunteer is injured, and have a plan in place for communicating about any after-hour issues;
7. Provide people-friendly park staff to work with the volunteers so they can train, trouble-shoot, ensure safety, and provide support for volunteers;
8. As with any citizen science event, make sure the volunteers feel appreciated and know why what they are doing is very important.

Adventure Scientist volunteers and interns on Saguaro Census plot in Saguaro National Park's west district.